

REMARKS

Applicants are in receipt of the Office Action mailed December 29, 2006, and have the following comments.

Remarks on Objections to and Amendments to the Drawings

The Applicants have received the objections to the drawings. Replacement Sheets 1/8, 7/8 and 8/8 accompany this Reply.

The Examiner indicates that Fig. 11 lacks a numeral associated with a lead line. Applicants believe that the Examiner may have intended to refer to Fig. 10. Accordingly, Applicants have submitted Replacement Sheet 8/8, in which the lead line in Fig. 10 has been indicated as referring to feature **38**. Applicants thank the Examiner for pointing out this informality.

Also, the hatching in original Fig. 10 has been deleted from the amended drawing in Replacement Sheet 8/8, consistent with the description of the originally filed specification, in accordance with the Examiner's comments.

The Examiner has also indicated that the section X---X in Fig. 1 should be indicated by numerals rather than letters pursuant to 37 CFR 1.184(i). Accordingly, Applicants have amended the drawing to indicate line I---I' in Replacement Sheet 1/8, and have also amended paragraph [0013] in a manner

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consistent therewith. In addition, paragraph [0013] has been amended to correct the manifestly erroneous reference to Fig. 3A in the Description of Drawings 5B, 5C, and 11.

New Figure 12 (in Replacement Sheet 7/8) has been added; this Figure is identical to Fig. 5A, except numerals 70 and 72 now refer to "slits" rather than the holes of Figure 5A. There is no new matter introduced by this drawing, since original paragraph [0016] described "slits (not shown) instead of holes 38, 40 would also work." Paragraph [0016] has been amended to indicate that "slits such as 70 and 72 (shown in Figure 12) instead of holes 38, 40 would also work." Thus, no new matter is added as a result of the new Figure 12.

The Examiner has stated that the drawings do not indicate "at least a portion of the outlet channel is opposite the outlet". Claim 1 has now been amended as indicated below to address this problem.

No new matter has been added to the specification as a result of the amendments to the Drawings.

Specification

The Examiner has stated that the term "mylar" should be capitalized. Therefore paragraph [0019] has been amended to refer to MYLAR® in capital letters.

The Examiner has indicated that on page 7, line 3 of the

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specification the reference to Figure 4B (which does not exist). Applicants have amended this reference to refer to Figure 5B, as was clearly originally intended.

The Examiner indicates lack of antecedent basis in the specification for "at least a portion of the outlet channel is opposite the outlet". The amendments to claim 1 and new claim 16 indicate "at least a portion of the outlet channel is opposite the outlet recess". This is clearly shown in the specification, e.g. at original Fig. 5A. Thus, no new matter has been introduced as a result of these claim amendments.

Claim Objections

Claim 3 was objected to for lacking the word "the" before the term "inlet". Although claim 3 has been cancelled without prejudice, this change has been made in amended claim 1 and new claim 16. Applicants regret any inconvenience this informality may have caused.

Rejections Pursuant to 35 U.S.C. §102(b)

Claims 1, 2, 5, and 10-13 were rejected as allegedly lacking novelty over Phelps, U.S. Patent No. 5,394,840. Applicants respectfully traverse this rejection for the following reasons.

A claim is not anticipated pursuant to 35 U.S.C. §102 unless a single prior art reference contains each and every

limitation of the claim and teaches a person of skill in the art to make and use the invention without undue experimentation. See *In re Paulsen*, 30 F.3d 1475, 31 USPQ 2d 1671 (Fed. Cir 1994). Thus, anticipation under 35 U.S.C. §102 requires identity of the claimed invention and the reference disclosure; there may be no differences between these, as viewed by the person of ordinary skill in the art in the field of the invention. See e.g., *Scripps Clinic & Res. Found. v. Genentech, Inc.*, 927 F.2d 1595, 18 USPQ2d 1001 (Fed. Cir. 1991).

Presently amended claim 1 and new claim 16 have incorporated the limitations of cancelled claim 3 into the two sole independent claims of the present application. This subject matter is drawn to a micropump wherein the inlet of the second layer comprises a recess surrounding a pedestal in abutment with the outlet slit of the intermediate flexible layer. Phelps does not disclose a micropump having a pedestal (such as 30 and 22) surrounded by a recess.

Phelps discloses a fuel supply system having a pump **16**. The pump **16** includes a diaphragm **48** located in a cavity between two housing portions **50** and **51**. The diaphragm **48** acts to divide the cavity into a fuel chamber **54** and a pumping chamber **56**. The pumping chamber **56** is connected to a vacuum source **58** that actuates the diaphragm **48** between two positions. In the first position, the diaphragm **48** opens an inlet valve **60** and draws fuel, via an inlet channel **46** into the fuel chamber **54**. Subsequently, the second position of the diaphragm **48** opens an outlet valve **62** and pumps the fuel from the chamber **54** into an outlet channel **39** (cf. column 3,

lines 5 - 50 of Phelps).

In addition to totally lacking any disclosure of a micropump comprising a pedestal abutting an inlet slit of the flexible layer, Phelps also does not disclose that a through-hole (such as 36 in Fig. 5A) is defined in one of the first layer and the second layer to be in fluid communication with the pumping chamber, as is required by present independent claims 1 and 16. This feature is found in Figures 5A-5C of the present specification and in original claim 12; it is now a feature of all the claims.

Accordingly, the Applicants contends that presently amended claim 1 and new claim 16 (and therefore all the dependent claims) are novel over Phelps, and respectfully request that the Examiner withdraw this ground of rejection over claims 1, 2, 5, and 10-13.

Rejection Pursuant to 35 U.S.C. §103(a)

Claims 1, 3, 4, 5, 10, 11 and 13 are rejected as being allegedly obvious in view of Kamper (U.S. Patent No. 6,033,191). Applicants note that claim 12 was not rejected on obviousness grounds; the feature of this claim has been incorporated into amended claim 1 and new claim 16.

The Office Action alleges that Kamper et al. disclose the invention substantially as claimed, except for the shape of the inlets and outlets. Applicants respectfully disagree and traverse this rejection for the following reasons.

The United States Supreme Court's decision in *Graham v. John Deere Co.*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966) sets forth the standards used in determining whether a claimed invention is obvious under 35 U.S.C. §103(a): "the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined." 383 U.S. at 17, 148 U.S.P.Q. at 467.

In applying this test in the case before it, the *Graham* Court found that the differences between the prior art and *Graham*'s invention rendered the invention obvious because "a person having ordinary skill in the prior art . . . would immediately see that the thing to do was what *Graham* did. . . ." 383 U.S. at 24, 148 U.S.P.Q. at 469 (emphasis added). In other words, when the invention is predictable in light of the prior art in such a way as would permit the person of ordinary skill in the art to "immediately see" the claimed invention, the invention is obvious.

The Supreme Court's recent decision in *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. ___, __ U.S.P.Q.2d __ (2007) affirms in every regard the standards set forth in *Graham*. Moreover, the *KSR* court indicated that in a proper rejection on obviousness grounds the Examiner must articulate reasoning with some rational underpinning to support the legal conclusion of obviousness, *id.*, slip op. at 14, such as "a reason that would have prompted a person of ordinary skill in the relevant field

to combine the [known] elements in the way the claimed new invention does." *Id.*, slip op. at 15.

In the present case, Kamper discloses a micromembrane pump including lower housing **1** and an upper housing **2**, a valve membrane **3** situated between the two halves of the housing **1** and **2**. The pump further includes a pump chamber **14** connected via a microchannel **13** to the upper housing **1**, said pump chamber **14** having therein a pump membrane **4** that adjoins the pump chamber wall **22**. The pump membrane **4** has a piezoactuator **5** attached thereto. When actuated by the piezoactuator **5** into a first position, the pump membrane **4** opens an inlet valve **12** of valve membrane **3** thereby letting in fluid into the housing **1** and **2**. The inlet valve **12** rests on a pedestal **10**. Similarly, the outlet valve **18** rests on a pedestal **16**.

As such, Kamper does not disclose nor in any way suggests the feature, present in the independent claims 1 and 16 of the present application, of a through-hole **36** defined in one of the first layer and the second layer to be in fluid communication with the pumping chamber (as was provided in original claim 12, and is exemplified in e.g., Fig. 5A-Fig. 5C of the present specification). Nothing in Kamper or in the Office Action provides any disclosure of a similar feature or reason justifying the conclusion of obviousness for the person or ordinary skill in the art to arrive at the present invention.

The Office Action also rejected claims 1-5, 10, 11 and 13 as being allegedly obvious over Bustgens et al., (U.S. Patent No. 5,725,363).

Bustgens discloses a polyimide membrane **3** sandwiched between the top **1** and bottom **2** parts of a pump housing; see Bustgens at Figure 1 and column 2, lines 39 - 44 and lines 62 - 64, for example. The pump housing forms therein a pump chamber **16** defined by recesses in the top **1** and bottom **2** parts of the pump housing (see Specification, Figure 1), said pump chamber **16** being linked by flow channels **6** (see Specification, column 2, line 45) to inlet **10** and outlet **13** valves. An actuation chamber **17** is adjacent to the pump chamber **16** as well.

Bustgens et al. also disclose a valve seat **14** on which the membrane **3** rests and a recess around said valve seat **14** (see Specification, Figures 3a - 4b). The pump membrane **3** is actuated via the existence of a pressure differential between the actuation chamber **17** and the pump chamber **16** (see Specification, column 3, lines 18 - 34). The valves are activated correspondingly during the actuation of the pump membrane **3**, which occurs by utilizing either gaseous or liquid means.

However, Bustgens does not disclose or suggest the feature, present in the independent claims 1 and 16 of the present application, of a through-hole (such as **36**) defined in one of the first layer and the second layer to be in fluid communication with the pumping chamber (as was provided in original claim 12, and is exemplified in e.g., Fig. 5A-Fig. 5C of the present specification. Nothing in Kamper or in the Office Action provides any disclosure of a similar feature or reason justifying the conclusion of obviousness for the person of ordinary skill in the art to arrive

at the present invention.

As such, the subject matter of presently amended claim 1 and new claim 16 (and the dependent claims) is not obvious in view of Bustgens et al.

Claims 6-8 were rejected pursuant to 35 U.S.C. §103(a) over the combination of any one of Phelps et al., Kamper et al., or Bustgens et al. as applied to claim 1, further in view of Rosenberg et al. (U.S. Patent No. 3,386,388). Rosenberg, is cited for disclosing that flexible layers of diaphragm-type pumps may be made from polycarbonate, which is a polymeric material.

As indicated above, not one of the cited references Phelps et al., Kamper et al., or Bustgens et al. discloses or suggests the through-hole (such as **36**) of the present invention. Nor does Rosenberg disclose such a feature. Therefore, any combination of these references fails to literally or implicitly provide any reason whatsoever for the person of ordinary skill in the art to make the presently claimed invention.

Similarly, Claims 6, 8 and 9 were rejected pursuant to 35 U.S.C. §103(a) over the combination of any one of Phelps et al., Kamper et al., or Bustgens et al. as applied to claim 1, further in view of Davis et al., U.S. Patent No. 3,715,174. Davis is said to disclose a MYLAR® membrane. For the same reasons stated in the last paragraph, the rejection of these claims over the any combination of these references is improper, and such combination does not lead to a legal conclusion that the present invention is

obvious.

Similarly, Claims 6, 8 and 9 were rejected pursuant to 35 U.S.C. §103(a) over the combination of any one of Phelps et al., Kamper et al., or Bustgens et al. as applied to claim 1, further in view of Davis et al., U.S. Patent No. 3,715,174. Davis is said to disclose a MYLAR® membrane. For the same reasons stated in the last paragraph, the rejection of these claims over the any combination of these references is improper, and such combination does not lead to a legal conclusion that the present invention is obvious.

Finally, claims 14 and 15 were rejected pursuant to 35 U.S.C. §103(a) over the combination of any one of Phelps et al., Kamper et al., or Bustgens et al. as applied to claim 1, further in view of Bishop, U.S. Patent No. 6,042,345. The Examiner states that Phelps et al., Kamper et al., and Bustgens et al. disclose a that the flexible layer is activated by a bimorph PZT cantilever, but that Bishop does disclose such a feature. However, none of the references even hints at a pump having a through hole such as feature **36** of Figure 5A. Thus for the same reasons stated in the last paragraph, the rejection of these claims over any combination of these references is improper, and such combination does not lead to a legal conclusion that the present invention is obvious.

Accordingly, the Applicants believe that the claims are fully patentable and respectfully request the Examiner to issue a Notice to that effect.

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If there are any unresolved questions regarding this Reply, a telephone call to the undersigned is invited.

Respectfully submitted,

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